



IPETRONIK
Software

Advantech ADAM PlugIn

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1 Important and general information

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1.2 General information

1.2.1 About this manual

This manual describes how to use the Advantech ADAM PlugIn together with the IPEmotion data acquisition software. It will describe how to install the PlugIn and how to establish a connection and how configure the ADAM 4000 IO modules using the ADAM-4520I Serial converter.

1.2.2 Version

This manual has the version number V1, released [09] [2013] © **All rights reserved !**

This manual was written according to PlugIn Version: V01.00.00.003

1.2.3 Legend of used icons

**Tip**

This icon indicates a useful tip that facilitates the application of the software.

**Information**

This icon indicates additional information for a better understanding.

**Attention!**

This icon indicates important information to avoid potential error messages.

1.2.4 Support

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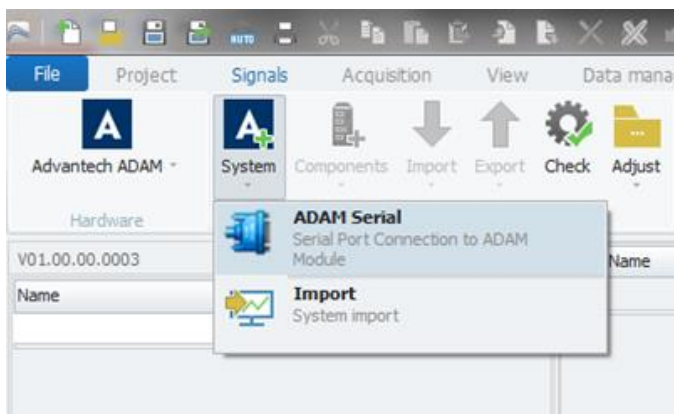
2 Overview of the PlugIn

2.1 PlugIn Installation

The Advantech ADAM PlugIn is hosted on the IPETRONIK website www.ipetronik.com. After having installed the PlugIn, you need to restart IPEmotion. A message window will notify you, telling that a new PlugIn was found. After activation, the PlugIn can be used for data acquisition.

2.2 General Configuration of the Advantech ADAM PlugIn

The ADAM PlugIn supports data communication to serial devices of the ADAM 4000 IO module family. In order to establish a communication with the IO modules, a system called the serial port communication interface needs to be set up.

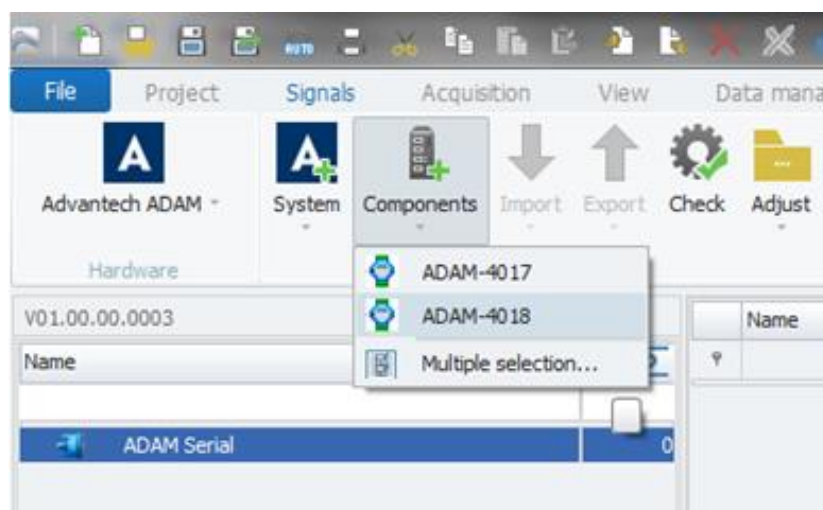


After this setup, as many ADAM IO modules can be created as needed.

Currently, the PlugIn is supporting two IO modules:

- ▶ ADAM-4017
- ▶ ADAM-4018

More modules of the ADAM-40xx and ADAM-41xx series can be implemented on request.



The following screenshot shows both IO modules created with all channels activated.

Name	Active	Unit	Phys Min	Phys Max	Sensor Min	Sensor Max	Sampling rate
AIN-0	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-1	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-2	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-3	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-4	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-5	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-6	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-7	<input checked="" type="checkbox"/>	V	-10,00	10,00	-10	10	1 Hz
AIN-0	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-1	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-2	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-3	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-4	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-5	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-6	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz
AIN-7	<input checked="" type="checkbox"/>	°C	0,00	760,00	0	760	1 Hz

2.3 IPEmotion vs Adam/APAX .NET utility software

The complete module configuration can be done with IPEmotion and the ADAM PlugIn. However when users consider the Advantech ADAM/APAX .NET utility software package to configure the devices, than it is important, that this SW is closed when working with IPEmotion.



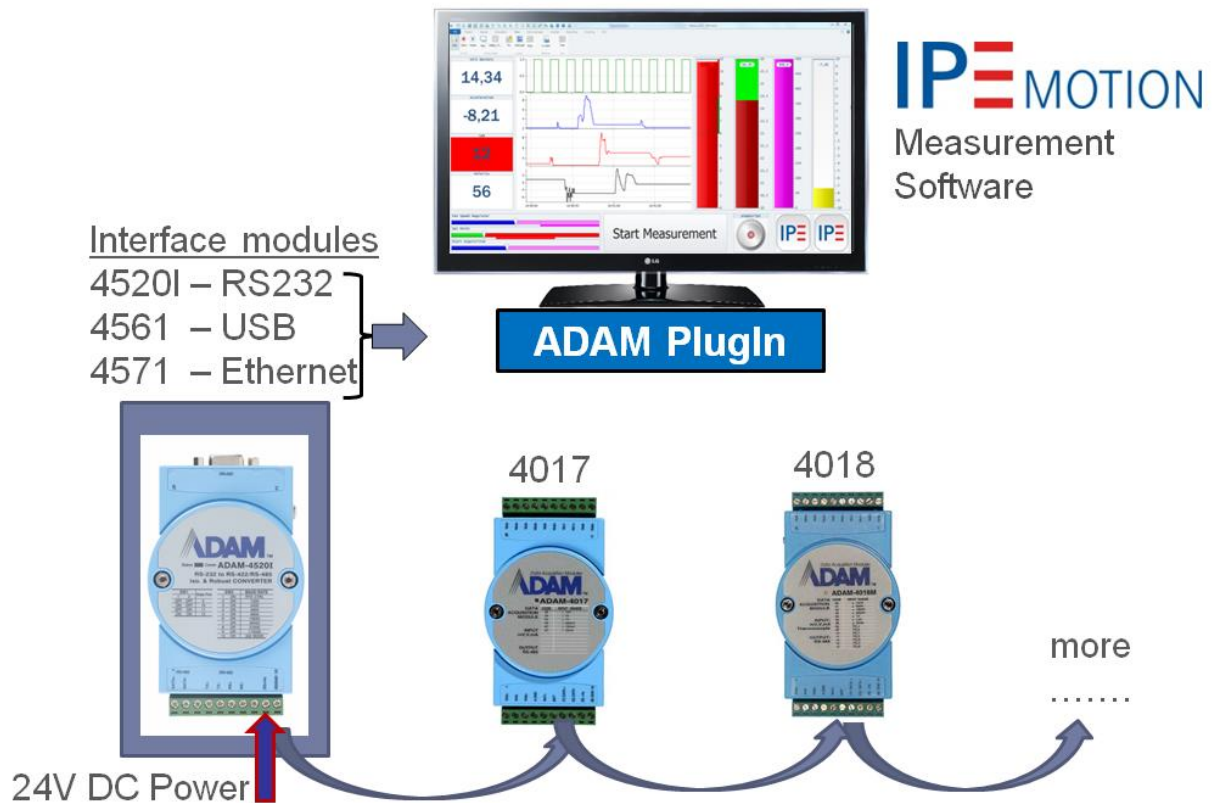
Attention!

When the ADAM/APAX .NET utility software is having a connection to the ADAM modules it is not possible for IPEmotion to communicate with the modules.

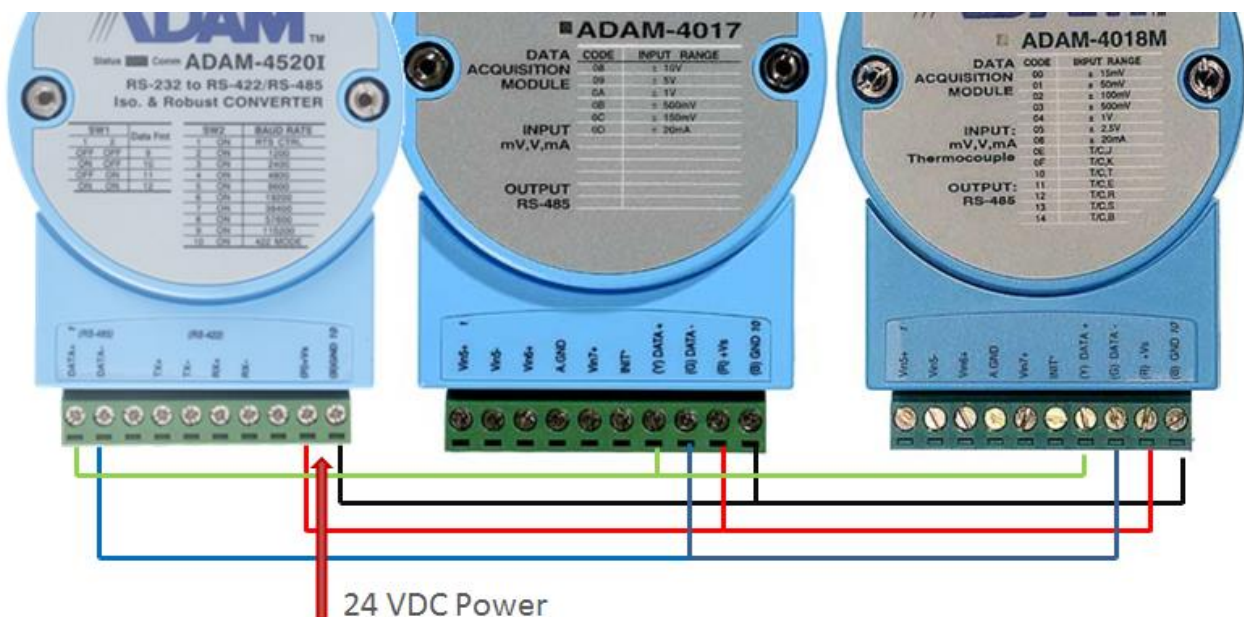
3 Configuration of communication parameters

3.1 Connection of modules and PC Interface

In order to communicate with the ADAM 4000 devices, it is required to establish a connection from the ADAM-4520I module to the serial port of the computer. The following graphic shows the connections between the modules. Several adapters are supported to interface the IO modules to the PC.

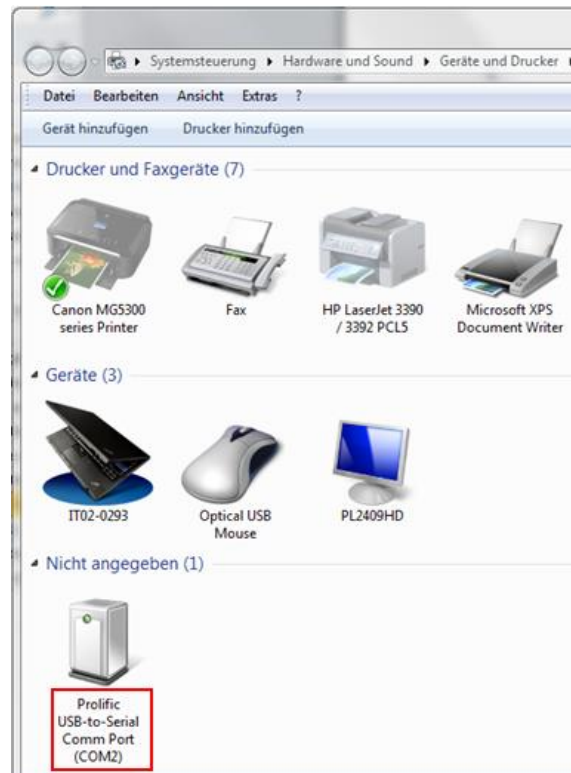


The detailed electrical connection is indicated in the following graphic. All modules supporting the ADAM-4520I interface module are wired up in a parallel connection.

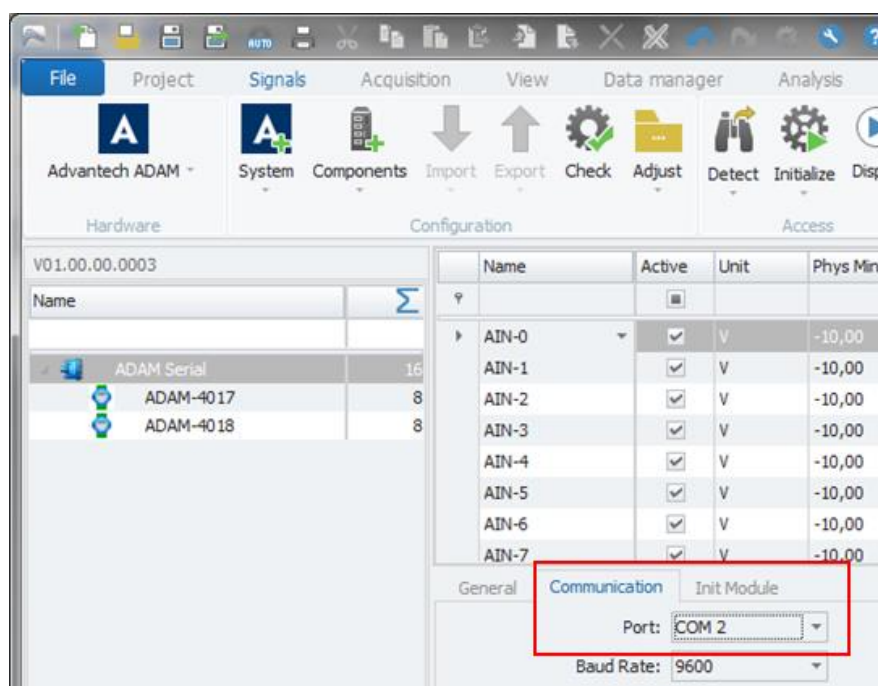


3.2 Identifying the COM Port number

After ADAM system power-up, the configuration of the communication parameters can start. In the very first step, the PC COM number must be identified. In the “Devices and Printers” menu we can see on which COM port number is used by the Serial Adapter. In this example, the adapter has COM port 2.



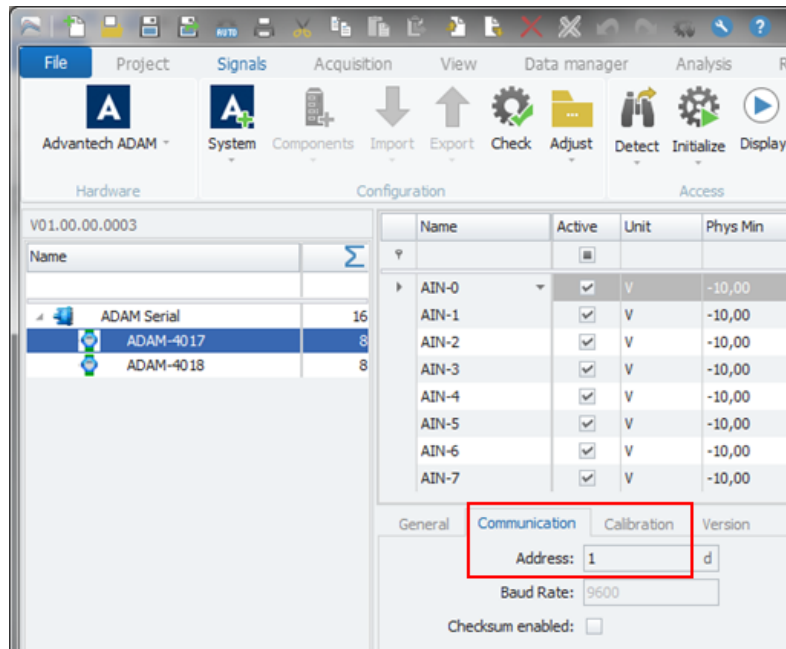
This COM Port number is now configured on the COM Module in the Communication tab sheet as the following screen shot is indicating.



3.3 Setting of Baud Rate / IO module address / Checksum

All modules in the system must be configured with the same baud rate. The factory default baud rate for all modules is 9600. When the baud rate of all modules is known and the same, it is only defined one time on the ADAM-4520I interface module.

The module address is defined on module level and also in the communication tab sheet of each module.



Another very important setting is the checksum. A module cannot be identified when the checksum setting configured in the module is not matching with the configuration in the PlugIn.



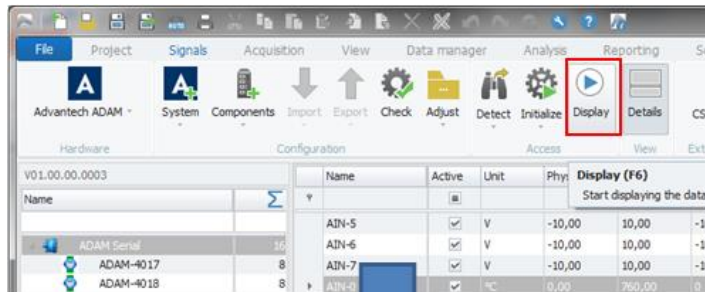
Information

In this hardware setup, the module settings are known.

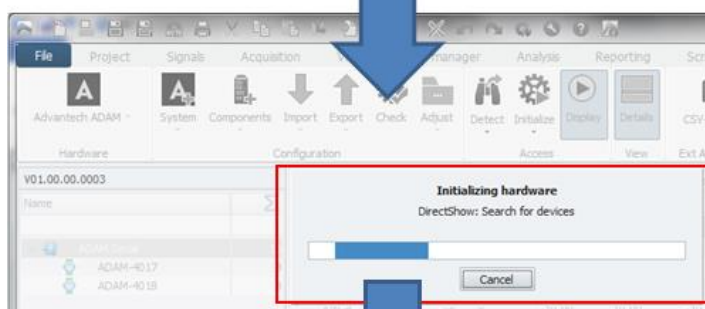
All modules have baud rate 9600, Module 4017 has address 1 and module 4018 has address 2. The checksum setting is deactivated on both modules

3.4 Hardware Initialization

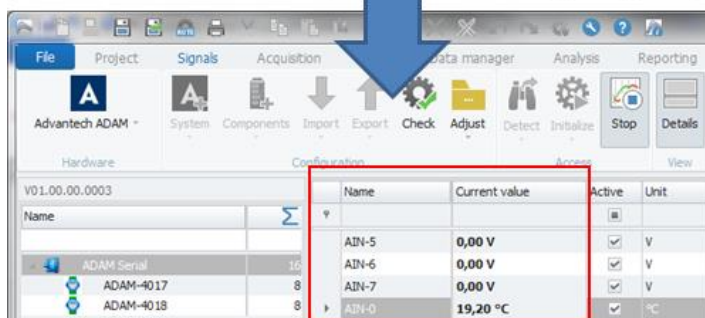
If all modules are configured with the correct parameters (COM port number, baud rate and module address), data acquisition can be directly started. The start **Display button** just needs to be pressed. Afterwards, the following steps are executed according to the 3 screen shots below.



Start Display



Searching for devices and checking communication

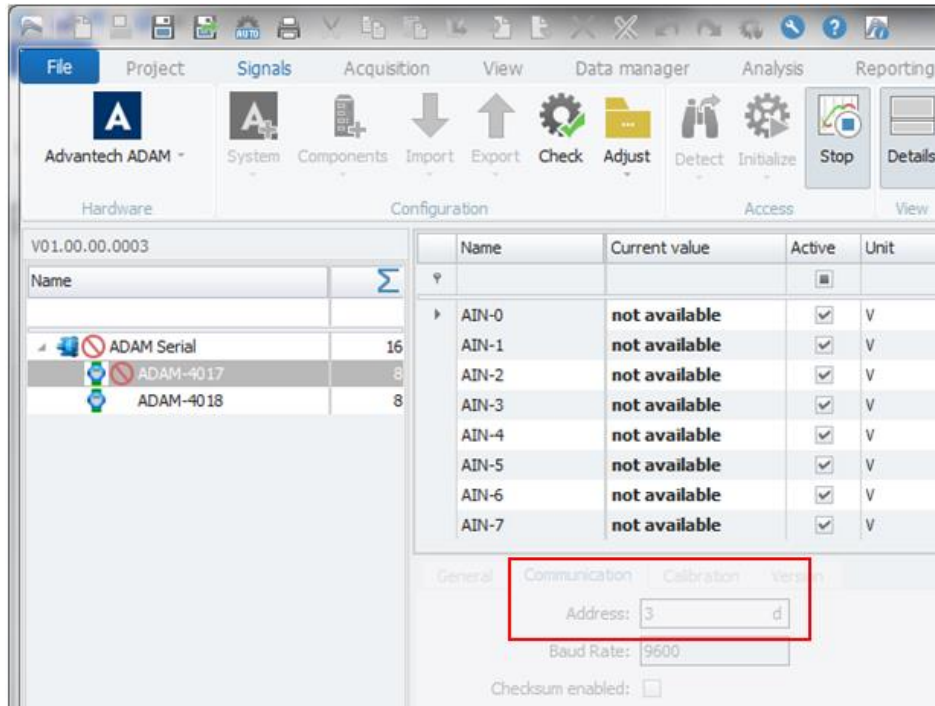


Check – OK
Data display

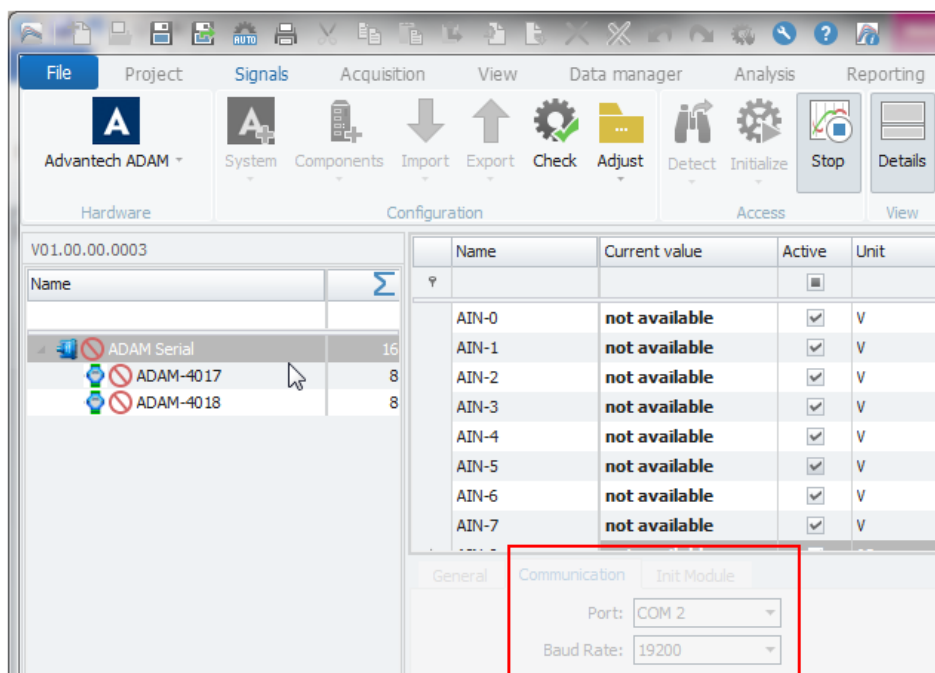
If all the module settings in the PlugIn are in line with the settings stored in the hardware, the communication is working correctly and data recording is started.

3.4.1 Communication error indication

If one parameter in the PlugIn is not matching the settings in the hardware, e.g. the module address for the first module 4017 is configured as 3 rather than 1, which is the correct module address, the PlugIn is indicating a problem with module 4017. The other module 4018 is still working correctly and indicating the room temperature.



If an overall parameter like COM port number or the baud rate is not configured correctly, the whole communication to the modules will not be working and will be indicating error messages.



4 Setting & identifying module setting – INIT function

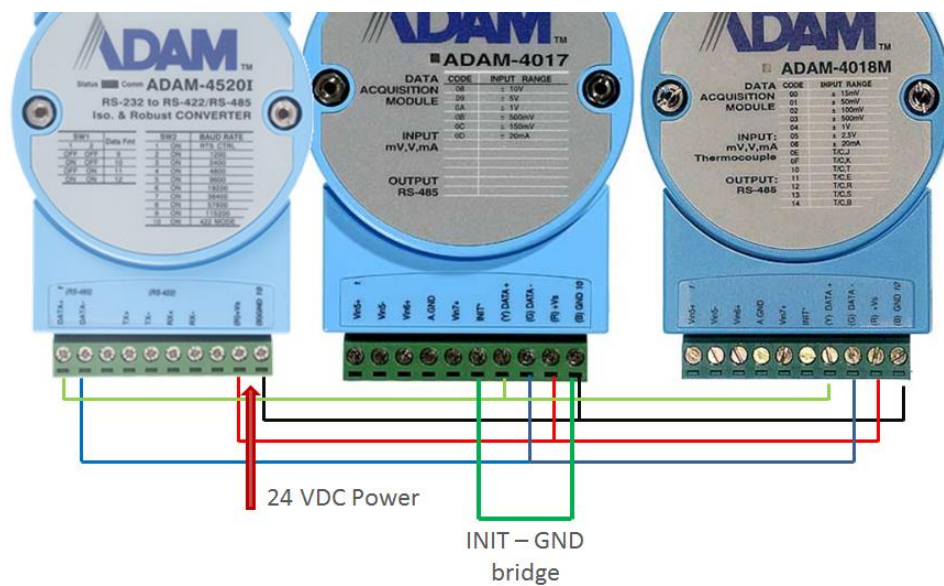
4.1 Establishing the INIT mode on module level

When systems with several modules are put together, it is necessary to change the factory setting of the module address, and also maybe baud rate, checksum and the integration time of 50 or 60 ms depending on the power grid net frequency (e.g. USA = 60 Hz).

Module settings which can be modified are:

- ▶ Module address
- ▶ Baud rate
- ▶ Checksum
- ▶ Integration time

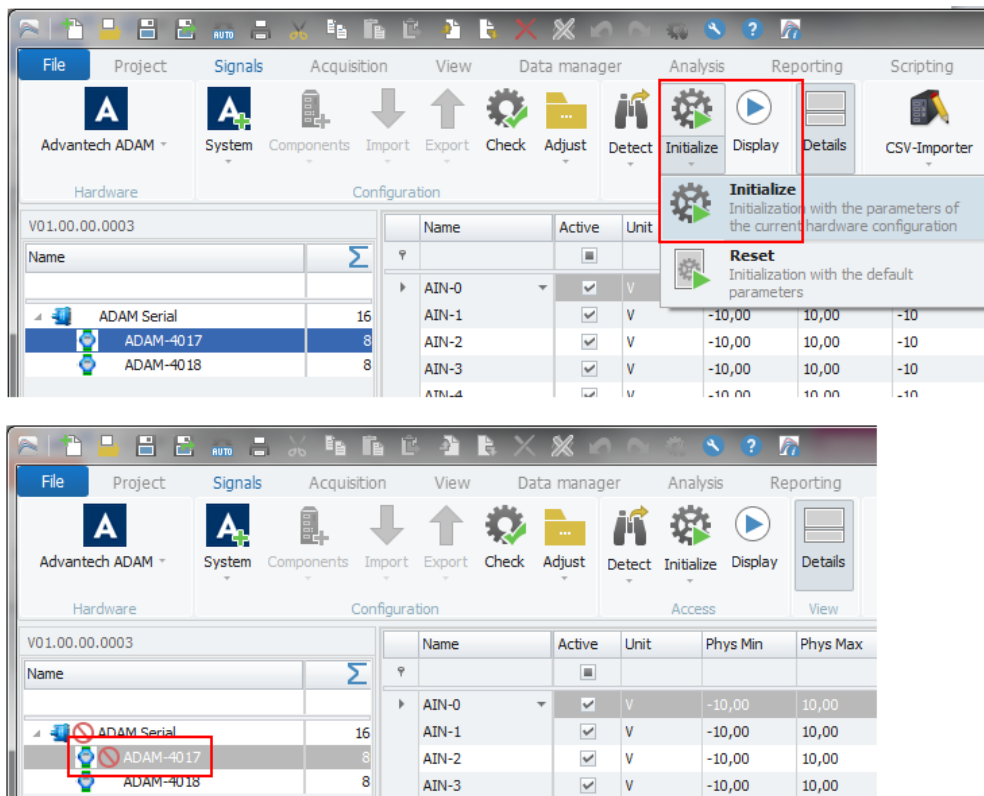
In order to change the module settings, the modules need to be put in an INIT status. With an electrical bridge between INIT terminal and the GRD (Ground) and after power OFF/ON, this module is put into the INIT status.



Attention!

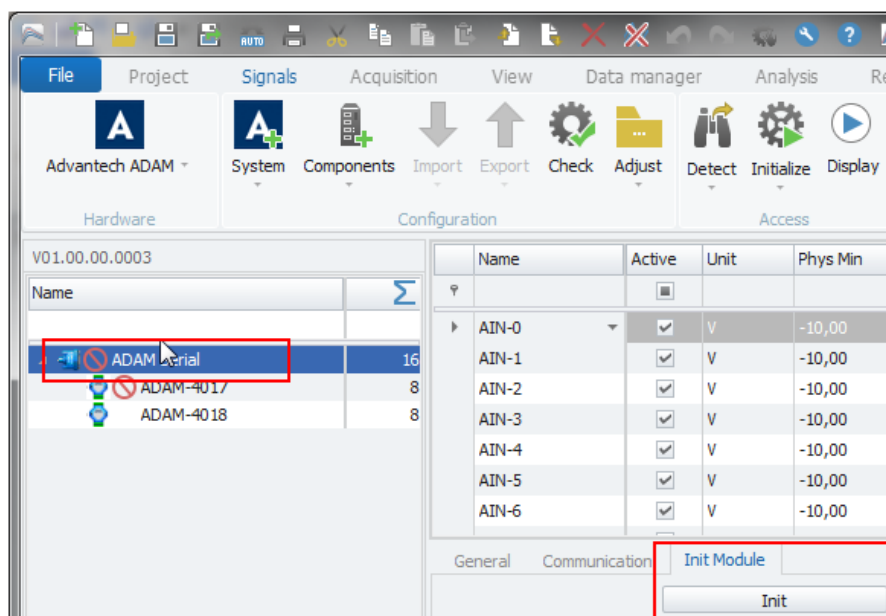
After bridging INIT-to-GND terminal, a power OFF/ON is needed to change a module into INIT status. Only one module at one point in time can be put into INIT status. It is not possible to configure several modules at the same time.

In IPEmotion, the **Initialize** function needs to be executed. Then, the INIT status - in this case the one of module 4017 - is indicated with an error sign.

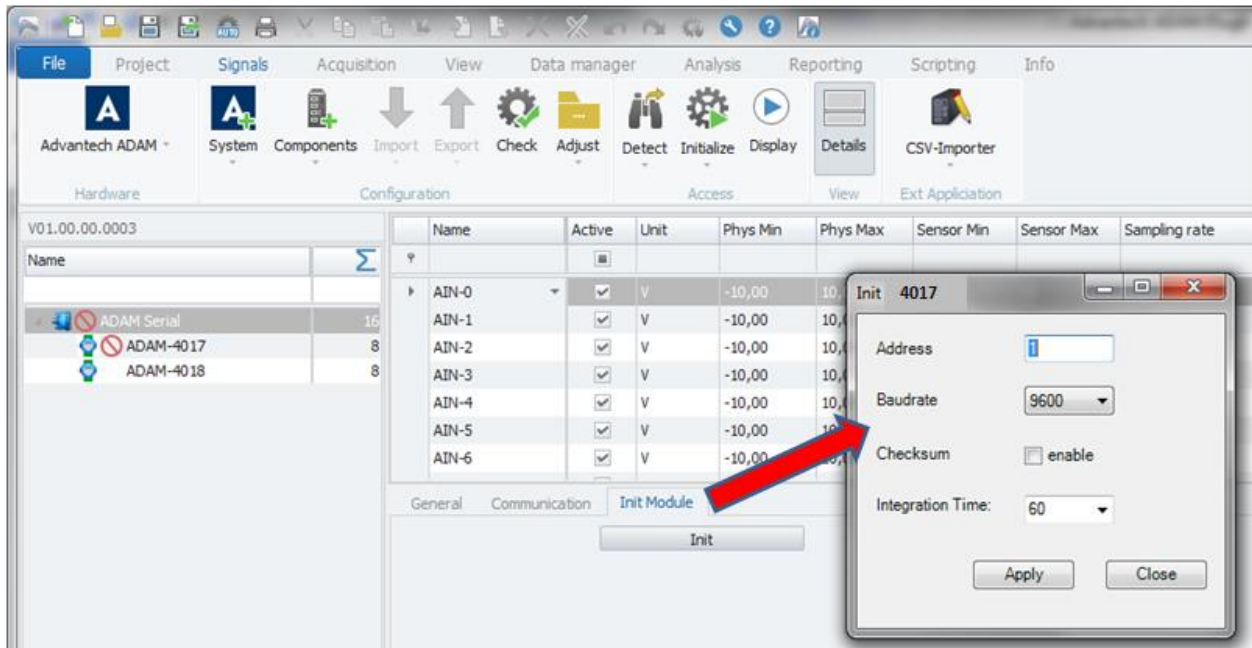


4.2 Changing the module setting with the INIT Module function

If a module is in the INIT status and the HW initialisation was executed, the module setting can be changed by launching the **INIT Module function** of the communication interface module.



The INIT function is opening the following dialog where the module setting can be changed.



NEW Settings



When the **Apply** button is activated, the new module settings are saved to the hardware. After applying new settings, the new cable bridge INIT-to-GND must be removed and the module power has to be turned OFF/ ON again.

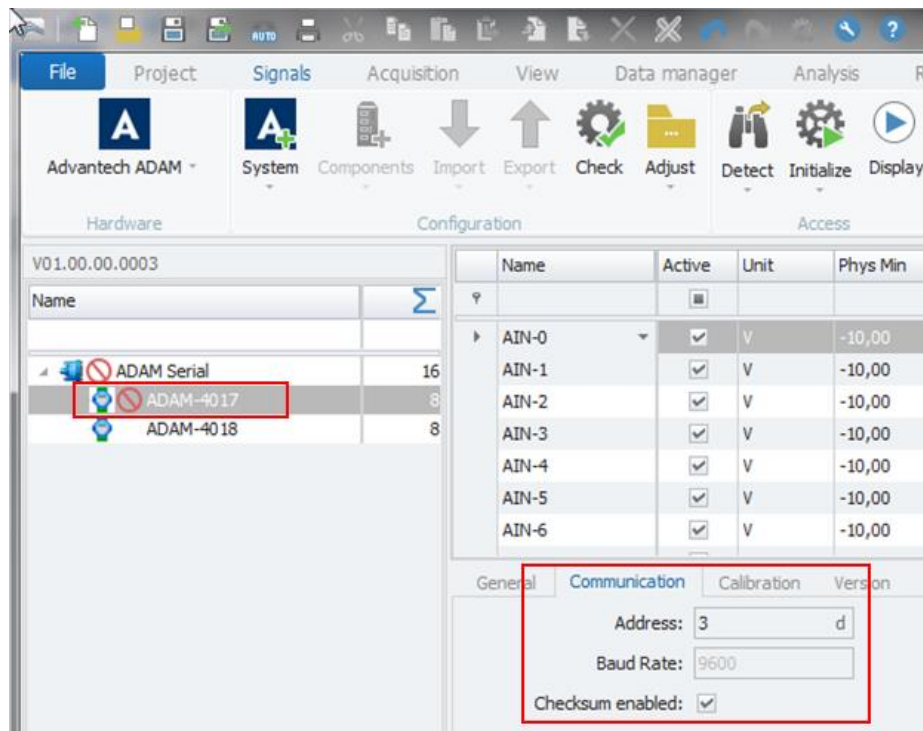


Attention!

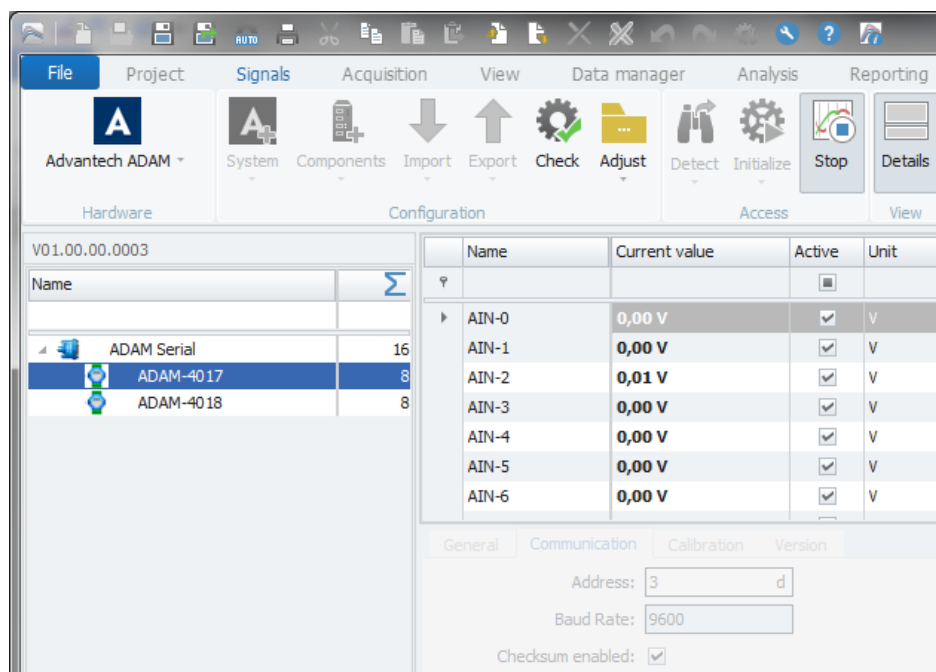
After applying the changes and removing the INIT-to-GND bridge, a one-time power OFF/ON is necessary to put the module back to the normal measurement status.

4.2.1 Transferring the new module setting

The new settings of module 4017 with a new address (3) and the checksum (enabled) are now also transferred to the PlugIn.



After this, the data display function cab is relaunched and measurements are working with the new setting.



Attention!

Changing the baud rate affects all modules. So every module needs to be initialized with the new baud rate one after another. After changing all the module's baud rates one by one, in the last step the COM interface module 4520I is set to the new baud rate.

5 Serial interface Module ADAM-4520I

5.1 Main features

The ADAM-4520I is an interface converter RS-232 to RS-422/485.

- ▶ Wide operating temperature range: -40 ~ 85 °C
- ▶ Automatic RS-485 data flow control
- ▶ 3000 VDC isolation protection
- ▶ Surge protection RS-485 data line
- ▶ Transmission speed up to 115.2 Kbps
- ▶ Networking up to 1200 meters (4000 feet)
- ▶ Reserved space for termination resistors
- ▶ Power and data flow indicator for troubleshooting
- ▶ Power requirement: +10 to +48 VDC
- ▶ Mounts easily on a DIN-rail, panel or piggyback

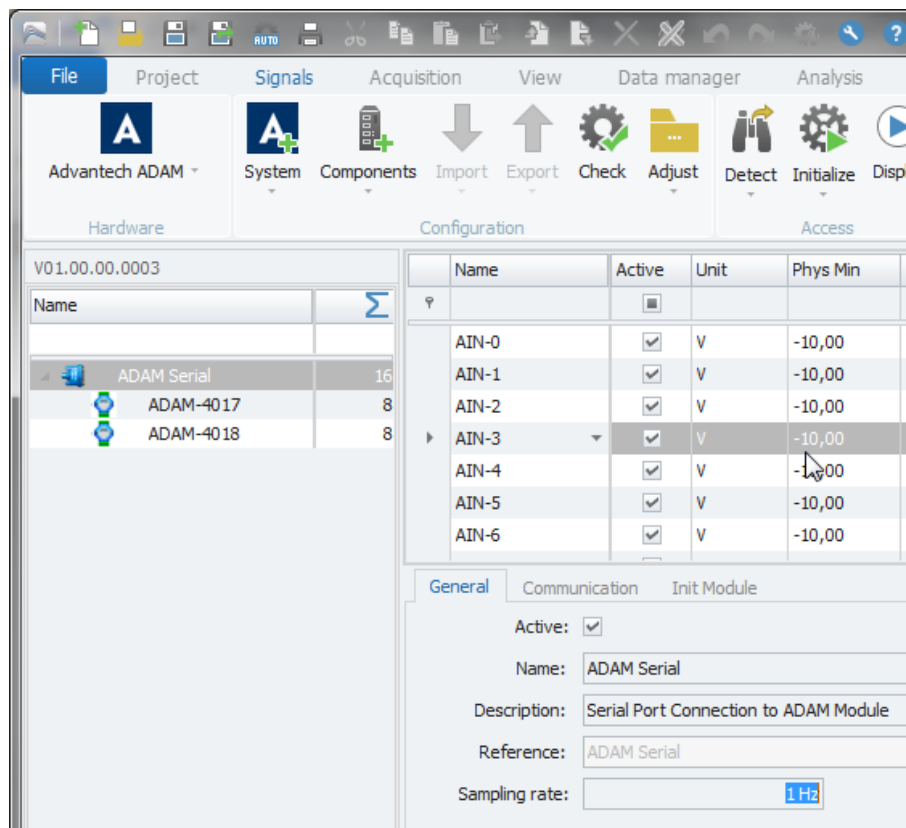
5.2 Picture of ADAM-4520I



5.3 PlugIn Configuration

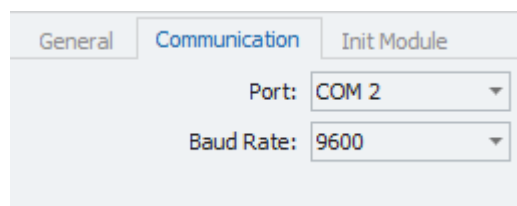
5.3.1 GENERAL tab sheet:

- ▶ Name
- ▶ Description
- ▶ Sampling rate (is applied to all inputs of all modules)



5.3.2 COMMUNICATION tab sheet

In the communication tab sheet, COM port number and system baud rate are defined:



6 Module ADAM-4017

6.1 Main features

- ▶ Channels: Six differential, two single-ended
- ▶ Input type: mV, V, mA
- ▶ Input range: ± 150 mV, ± 500 mV, ± 1 V, ± 5 V, ± 10 V, ± 20 mA
- ▶ Sampling rate: 10 samples/sec. (total)

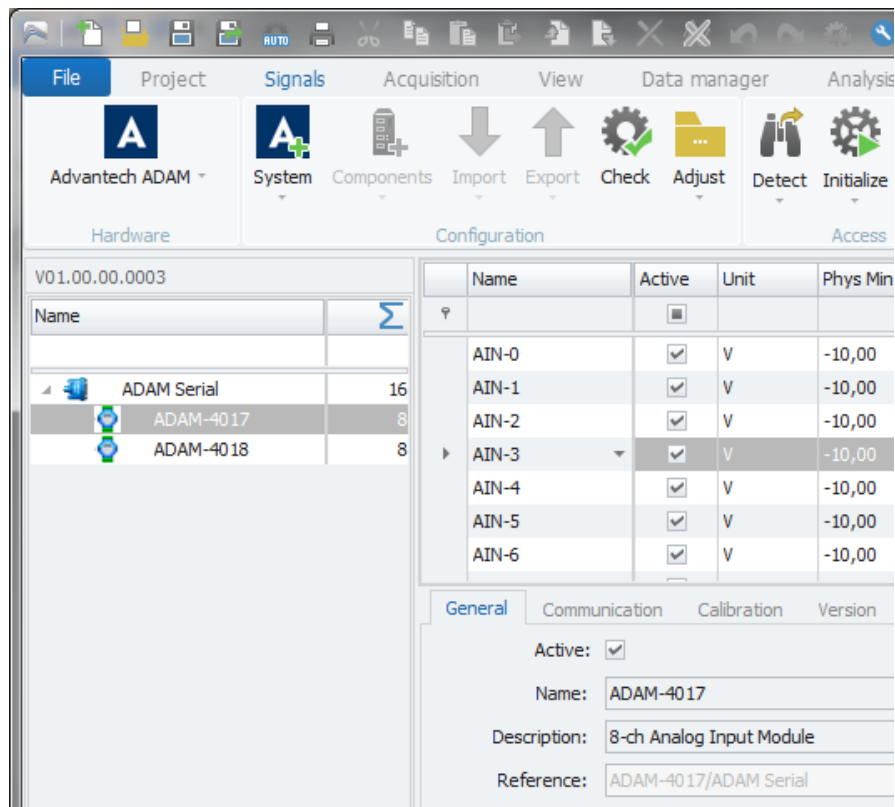
6.2 Picture of ADAM-40017



6.3 PlugIn configuration

6.3.1 GENERAL tab sheet

- ▶ Channel Name
- ▶ Channel Description
- ▶ Active YES / NO



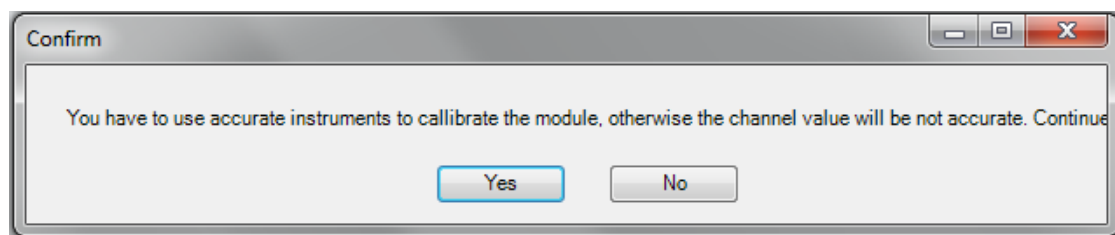
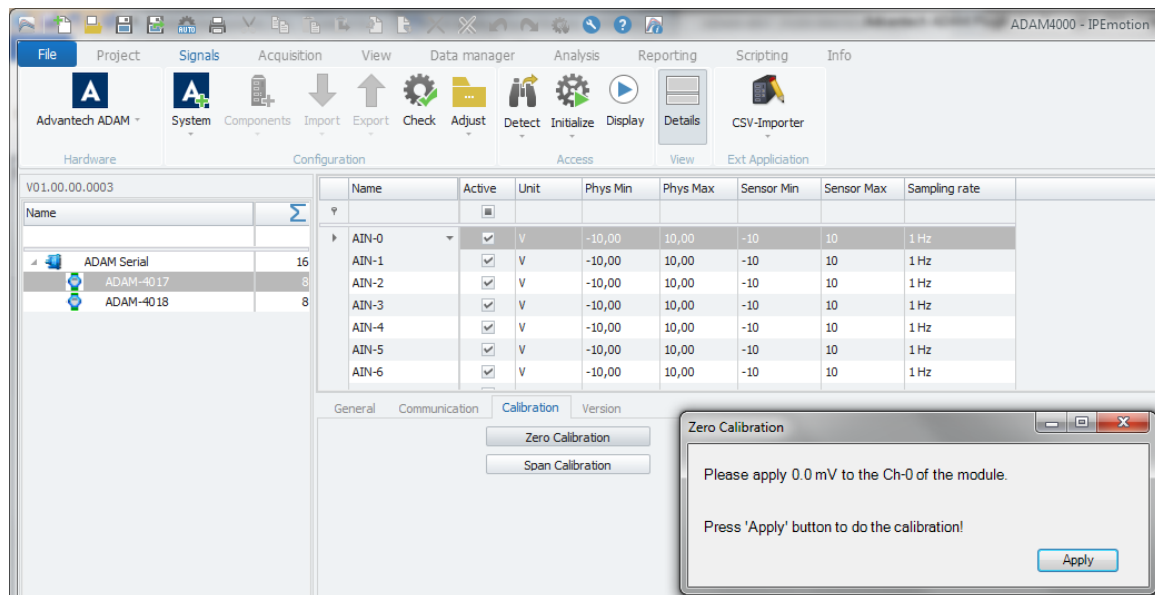
6.3.2 COMMUNICATION tab sheet

In the communication tab sheet, the module address and the checksum settings are defined. The baud rate is automatically configured through the interface module.



6.3.3 CALIBRATION tab sheet

The inputs can be calibrated for ZERO and SPAN. The calibration source is connected to the first channel (AIN-0) and the calibration values are applied to all inputs.



7 Configuration options in the Module ADAM-4018

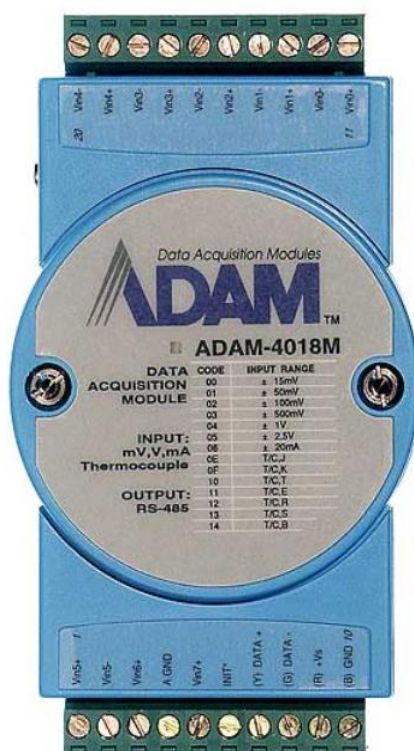
7.1 Main features

- ▶ Channels: Six differential, two single-ended
- ▶ Input type: Thermocouple, mV, V, mA
- ▶ Fault and overvoltage protection
- ▶ Watchdog Timer
- ▶ Sampling rate: 10 samples/sec. (total)
- ▶ Input Range ± 15 mV, ± 50 mV, ± 100 mV, ± 500 mV, ± 1 V, ± 2.5 V, ± 20 mA

TC Types Temperature Ranges

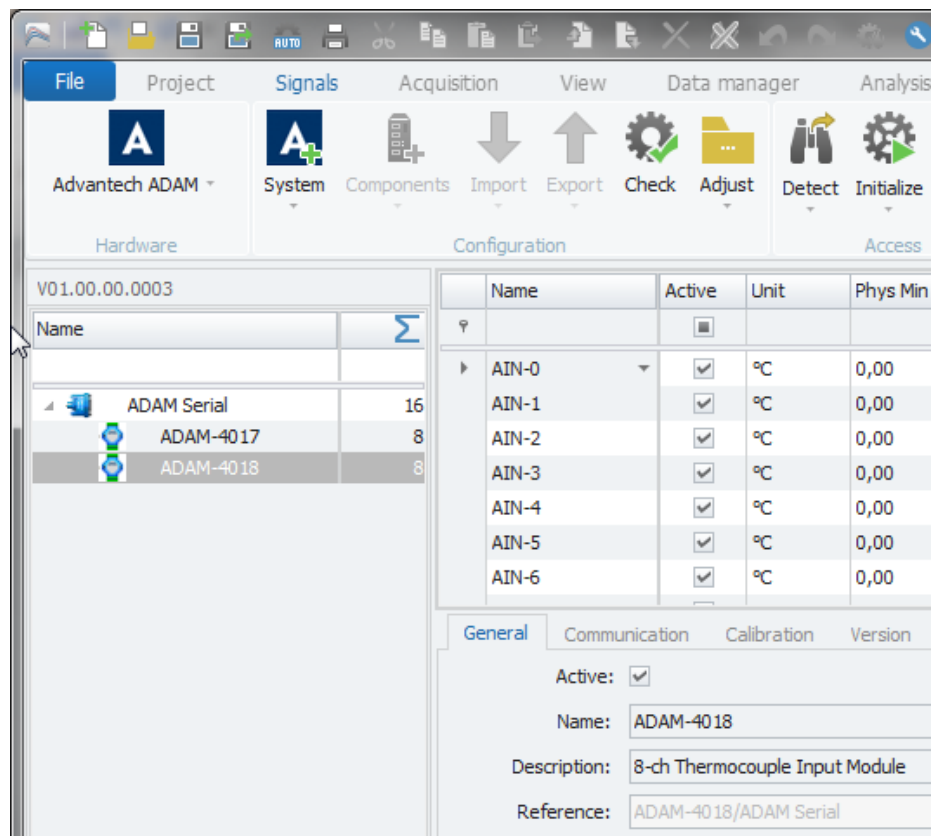
- ▶ J 0 ~ 760 °C
- ▶ R 500 ~1750 °C
- ▶ K 0 ~ 1370 °C
- ▶ S 500 ~1750 °C
- ▶ T -100 ~ 400 °C
- ▶ B 500 ~1800 °C
- ▶ E 0 ~ 1000 °C

7.2 Picture of ADAM-4018



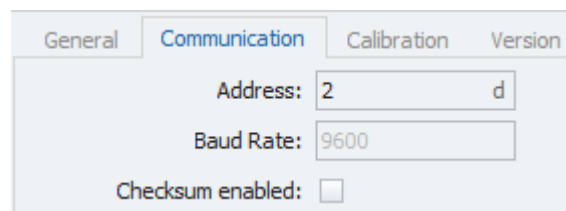
7.2.1 GENERAL tab sheet

- ▶ Channel Name
- ▶ Channel Description
- ▶ Active YES / NO



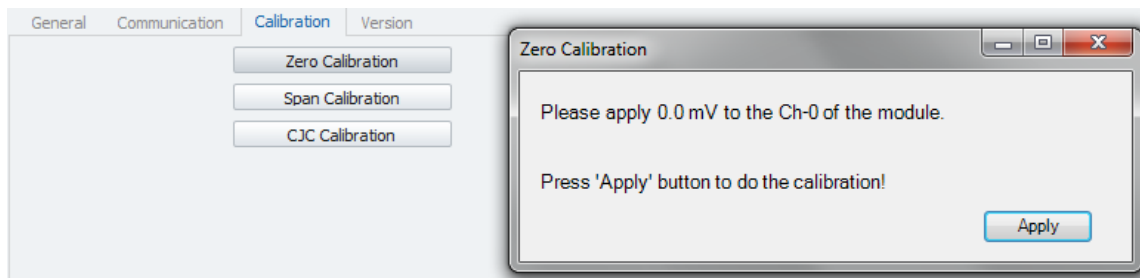
7.2.2 COMMUNICATION tab sheet

In the communication tab sheet, the module address and the checksum setting is defined. The baud rate is automatically configured through the interface module.

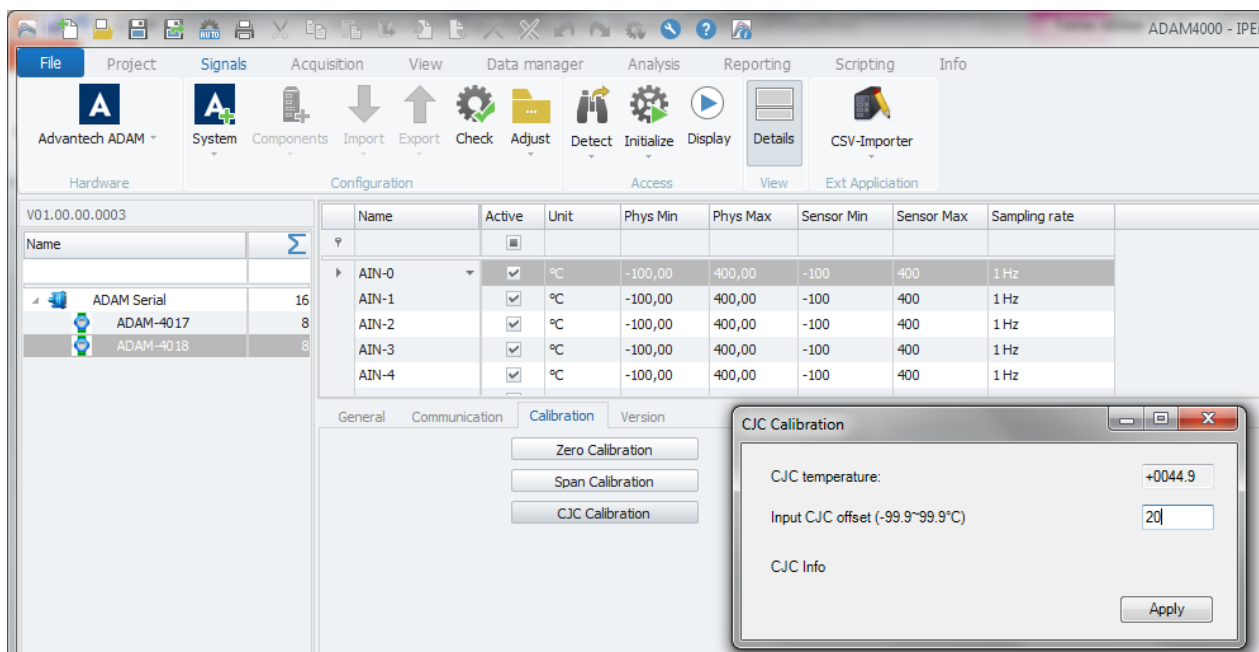


7.2.3 CALIBRATION tab sheet

The inputs can be calibrated for ZERO and SPAN. The calibration source is connected to the first channel (AIN-0) and the calibration values are applied to all inputs.



For the TC inputs, it is also possible to calibrate an OFFSET for the cold junction compensation CJC. All temperature measurements are shifted by the amount of the CJC offset.



After CJC compensation, the ambient temperature readings of around 20 °C are shifted to 40 °C.

